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Electronic Analog Display

The Nikonos RS electronic analog display appears in the following cases:

- They always appear when Exposure mode is set to "Manual."
- Electronic Analog Display appears when "Hi" or "Lo" indicator blinks in aperture-priority auto exposure (A) mode. (No "Hi" or "Lo" indicator blinks when Speedlight is mounted.)

Examples of Electronic Analog Display

(1) Correct exposure

+2..1..0..1..2-

(2) Underexposure by 1/3 EV step

+2..1..0..1..2-

(3) Overexposure by 1 EV step or more

+2..1..0..1..2-

Obtaining the Correct Exposure

- If the exposure mode is set to "Manual," correct exposure state (as shown above (1)) can be controlled by both aperture and shutter speed settings.
- If the exposure mode is set to "A," correct exposure state (as shown above (1)) can be controlled by the aperture setting.
 - In this case, the exposure indicator goes out as soon as the correct exposure has been obtained.

Exposure Compensation

When shooting a strongly backlit subject or when the main subject contrasts sharply with the background, the correct exposure may not be obtained; exposure compensation is recommended.

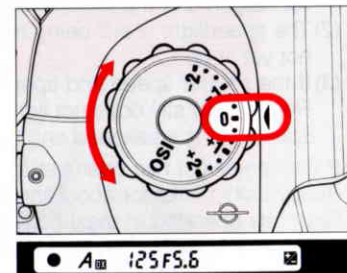
Important

There are often instances in underwater photography, depending on shooting situations, where it is difficult to determine the correct exposure. In these cases, we recommend shooting several frames of exposure-compensated photographs in both the over- and underexposed areas of the viewfinder.

In Aperture-Priority Auto Exposure (A) mode

In Aperture-Priority Auto Exposure (A) mode, turn the Exposure Compensation Dial to compensate the exposure from +2EV to -2EV in increments of 1/3 EV step.

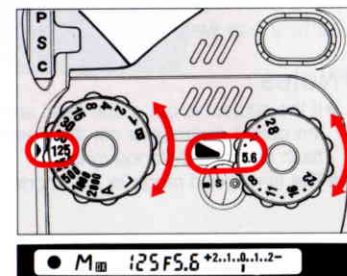
- Lift the Exposure Compensation Dial up slightly while turning it.
- A [+ / -] exposure compensation mark illuminates in the viewfinder during compensation. (See page 20.)



In Manual Exposure mode

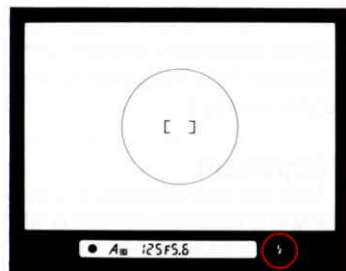
In Manual Exposure mode, the desired exposure value can be freely set by changing the aperture or shutter speed.

- Set the aperture or shutter speed while pressing the shutter release button slightly and monitoring the exposure indicator inside the viewfinder.



Flash Ready-Light

The Ready-Light appears at the right side of the viewfinder. When a Nikon Speedlight SB-104 has been attached to the camera, the recharging status and flash firing condition can be checked while looking through the viewfinder. (This is also possible with the SB-102/SB-103.)



Functions of the Ready-Light

- When the speedlight power has been turned on and the shutter release button is pressed slightly...
 - (1) The Ready-Light illuminates when the speedlight has been recharged and the flash is ready to fire.
 - (2) The speedlight is still being recharged if the Ready-Light has not yet lit up.
 - (3) If the shutter speed and aperture value are visible but the Ready-Light still does not light up, the battery of the speedlight is weakened and needs to be replaced.
- If the speedlight has been set to TTL flash mode and the Ready-Light blinks for about three seconds after shooting, the flash has operated at maximum power. Check again the object distance and flash shooting distance range.
- Except for cases in which the speedlight is being used for continuous shooting (repeated firing), if the speedlight takes more than time specified for each speedlight to recycle, the battery has weakened and needs to be recharged or replaced.

◆ Notes

- ◆ If the subject is out of the flash shooting distance range, either adjust the object distance or set the Aperture Dial to a value within the flash shooting distance range.
- ◆ The film speed range in TTL mode is from ISO 25 to 1000.

Controls in Detail



Shutter Speed and Aperture

Exposure (the amount of light reaching the film) is controlled by the combination of a shutter speed and an aperture setting. For example, the amount of light at 1/250 second is one half that at 1/125 second, and the amount of light at 1/60 second is twice that at 1/125 second. Likewise, the amount of light at f/8 is one half that at f/5.6, and the amount of light at f/4 is twice that at f/5.6.

Thus, if you obtain the correct exposure with the combination of 1/125 second and f/5.6, you also obtain the correct exposure with the combinations of shutter speed and aperture as shown in the table below. All combinations give the same exposure.

Shutter speed/aperture combinations that give the same exposure

Shutter speed (sec.)	1/2000	1/1000	1/500	1/250	1/125	1/60	1/30	1/15	1/8
Aperture (f-number)	1.4	2	2.8	4	5.6	8	11	16	22

Once you understand these combinations, you will be able to enjoy a greater degree of creativity in taking photographs.

Depth of Field

When focusing on a subject, a certain range in the front and behind the subject will be sharp (in focus); the farther away from the subject, the more blurred these areas will appear. This in-focus zone is known as Depth of Field. When the zone of sharpness is large, the depth of field is "deep," and when it is small, the depth of field is "shallow."

◆Notes

The depth of field works in the following ways:

When a lens of the same focal length is used . . .

- (1) The smaller the aperture (the larger the f-number), the deeper the depth of field; the larger the aperture (the smaller the f-number), the shallower the depth of field.
- (2) The depth of field becomes deeper the farther the subject is from the lens; it becomes shallower the closer the subject is to the lens.
- (3) The depth of field is deeper behind the subject and shallower in front of the subject (1/3 in front and 2/3 behind at normal distances).

When the same aperture values are used and subject distances remain the same . . .

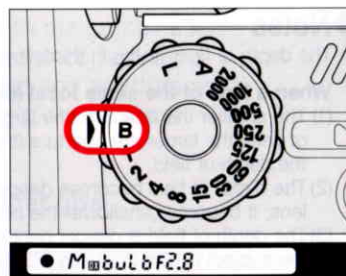
- (4) The shorter the focal length, the deeper the depth of field; the longer the focal length, the shallower the depth of field.

You can control the depth of field in your photographs to produce a result where only the main subject is in focus, or where the foreground and background are also in focus.

Long-Time Exposure (Bulb) Photography

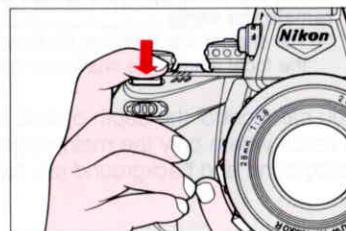
Long-Time Exposure "B" (Bulb) photography is useful when you wish to expose a frame for one second or longer. In this mode, the shutter curtain remains open for as long as the shutter release button is held down.

- 1** Set the Shutter Speed Dial to "B."
—When shutter speed dial is set to "B," "M bulb" and the aperture value are displayed inside the viewfinder.



- 2** Set the desired aperture and press the shutter release button (holding it down).

—The shutter curtain will remain open for as long as the shutter release button is held down.



- 3** To end exposure, release your finger from the shutter release button.

• Caution

The length of time that Long-Time Exposure (Bulb) Photography remains possible depends on the life of the battery in the camera.

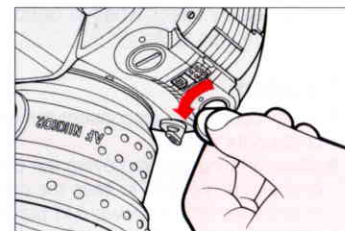
- When a new lithium battery is used, the length of time will be approximately 7 hours (at a temperature of 20°C).
- Since the battery's performance drops when the temperature falls below the freezing point (0°C), the time of continuous shooting will be less.

Remote Control Photography

An optional remote cord (MC-100) can be connected to the Nikonos RS enabling the shutter to be released from a distance.

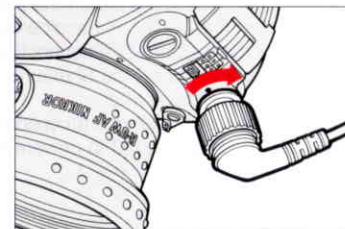
(Refer to the latest brochure.)

- 1** Turn the remote (optional) cap in the direction of the arrow using a coin or similar object to remove it.

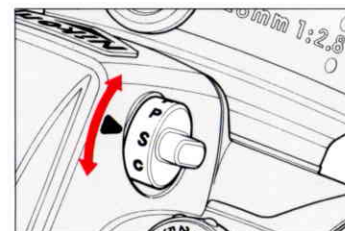


- 2** Insert the remote cord and fasten it securely.

—Be sure to smear the lubricant onto the O-ring when mounting the remote cord.

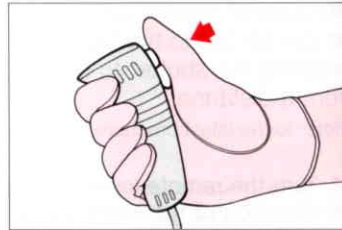


- 3** Set the focus mode to "C," "S," "P," or "F," and select the exposure mode.



4 Press the release button on the cord to take the photograph.

- Press the release button slightly to activate autofocus.
- Press the button slowly and steadily.
- When the shutter is released, the LED on the remote grip illuminates so that you can easily check whether or not the picture was taken.

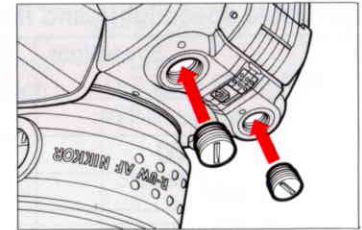


● Caution

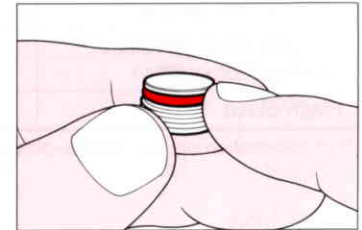
- Never connect or disconnect the remote cord under water.
- When attaching or removing the control connectors, be sure to keep the camera flat or point the lens downward to prevent water from getting inside the camera body.
- Be sure to wipe moisture off the inner parts.
- To ensure that you do not accidentally release the shutter while connecting the remote cord, first set the Shutter Speed Dial to "L" to lock the shutter.
- Cover the viewfinder with an optional Eyepiece Cover DK-100 to prevent the light from entering.

Caps for Remote Terminal and Sync Terminal

The caps for the remote and sync terminals are used to prevent water from getting into the terminals. Be sure that they are securely attached when you are not using the remote cord or the speedlight.



When attaching or removing the caps, do not forget to check the O-rings, channels and their contact surfaces, and to lubricate them.



If water should enter into the connector terminals or light rust should gather on the contacts of the connector terminals, take the camera to your nearest Nikon service center as soon as possible.





Available speedlights and flash modes

Flash mode \ Speedlight	SB-104	SB-102	SB103
Matrix balanced fill-flash	○	○	○
TTL auto	○	○	○
Non-TTL auto	×	○	×
Non-TTL manual	○	○	○
Rear-curtain sync	○	○	○
Camera Slave (cordless remote photography)	○	×	×
Flash Slave	○	○	×

*For information on speedlights, please refer to the instruction manual provided.

● Caution

Concerning speedlights produced by other manufacturers
If speedlights of other manufacturers requiring 250 volts or more are used on the X contact of this camera, not only will the camera not function properly, the circuitry of the camera and the sync circuitry for the speedlight may also be damaged.

Possible shooting modes	Nikonos RS settings		SB-104 settings		
	Sync mode (*2)	Exposure mode (*3)	Standby switch	Function selector (*1)	Flash mode selector
Matrix balanced fill-flash (*4)	Desired mode	Aperture-priority auto	ON	 Standard	TTL
Center-weighted TTL flash (*6)	Desired mode	Manual	ON	 Standard	TTL
Rear-curtain sync	Rear-curtain sync	Desired mode	ON	 Standard	Desired mode
Manual (*5)	Desired mode	Desired mode	ON	 Standard	M Full M 1/4 M 1/16

*1 Set the function selector to "Standard" for operations other than Camera Slave or Flash Slave.

*2 When the sync mode is set to "Normal" in aperture-priority auto exposure mode (A), the shutter speed is controlled between 1/125 and 1/30 second. (When it is set to "Rear", the shutter speed is controlled between 1/125 and 1 second.)

*3 In manual exposure mode, the shutter speed can be set at 1/125 second to 1 second, or B (bulb). (When shutter speed is set to 1/2000 to 1/250 second, it is automatically controlled at 1/125 second.)

*4 In matrix balanced fill-flash operation, set the aperture dial so that the electronic analog display in the viewfinder goes out. If the photograph is taken while the electronic analog display appears, the operation is automatically controlled by center-weighted TTL flash. (In this case the main subject is taken at the correct exposure but with no background exposure adjustment.) Refer to "Matrix Balanced Fill-Flash" on page 10.

*5 When setting the flash mode selector in manual shooting mode, select a guide number (MFull, M1/4, or M1/16) so that the actual shooting distance corresponds to that of the exposure calculation chart.

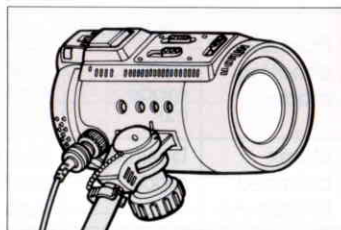
Manual Flash Exposure mode

The flash output that falls on the foreground subject is directly related to the selected power setting on the SB-104 and the distance from the Speedlight to the subject.

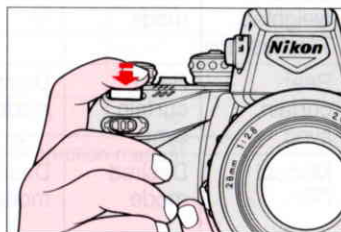
*6 Center-Weighted TTL Auto Exposure

The flash output that falls on the foreground subject is automatically controlled by the camera as a result of measuring the amount of light which passes through the lens and strikes the film. It has no effect on the background ambient light, which is controlled manually by the photographers shutter speed and aperture settings.

- 1** Select a possible shooting mode, and set the Nikonos RS and the SB-104.

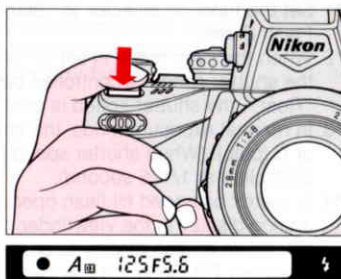


- 2** Press the shutter release button slightly.



- 3** Confirm the flash shooting distance range and check to be sure that the ready-light and the (●) in-focus indicator are lit up to shoot.

- If both viewfinder ready-light and SB-104 ready-light blink for about three seconds after shooting, the flash has operated at maximum power.
- In this case, either reduce the object distance, or select a smaller f-number.



◆Note

For details on the method of connection, checking the flash shooting distance range, Camera Slave (cordless remote photography), Flash Slave photography, see the Instruction Manual provided with the speedlight being used.

Using the Nikonos RS with the Speedlights SB-102 and SB-103.

Possible shooting modes	Nikonos RS settings		SB-102, SB-103 settings
	Sync mode (*1)	Exposure mode (*2)	Flash mode selector
Matrix balanced fill-flash (*3)	Desired mode	Aperture-priority auto	TTL
Center-weighted TTL flash (*4)	Desired mode	Manual	TTL
Rear-curtain sync	Rear-curtain sync	Desired mode	Desired mode
Manual	Desired mode	Desired mode	M Full M 1/4 M 1/16

*1 When the sync mode is set to "Normal" in aperture-priority auto exposure mode (A), the shutter speed is controlled between 1/125 and 1/30 second. (When it is set to "Rear", the shutter speed is controlled between 1/125 and 1 second.)

*2 In manual exposure mode, the shutter speed can be set at 1/125 second to 1 second, or B (bulb). (When shutter speed is set to 1/2000 to 1/250 second, it is automatically controlled at 1/125 second)

*3 In matrix balanced fill-flash operation, set the aperture dial so that the electronic analog display in the viewfinder goes out. If the photograph is taken while the electronic analog display appears, the operation is automatically controlled by center-weighted TTL flash. (In this case the main subject is taken at the correct exposure but with no background exposure adjustment.) Refer to "Matrix Balanced Fill-Flash" on page 10.

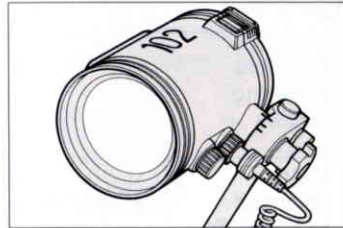
*4 Center-Weighted TTL Auto Exposure

The flash output that falls on the foreground subject is automatically controlled by the camera as a result of measuring the amount of light which passes through the lens and strikes the film. It has no effect on the background ambient light, which is controlled manually by the photographers shutter speed and aperture settings.

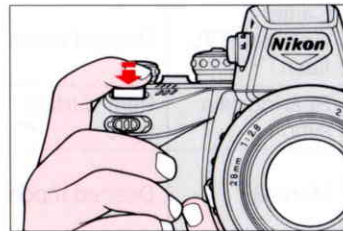
●Caution

- Speedlights SB-102 and SB-103 are designed to withstand water pressure up to a depth of 50 meters (164 feet).

- 1 Select a possible shooting mode, and set the speedlight (SB-102 or SB-103) and the camera.

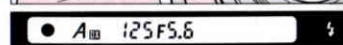
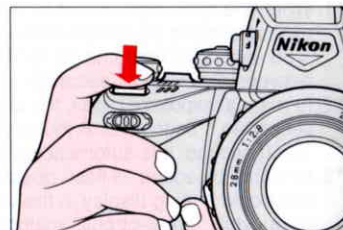


- 2 Press the shutter release button slightly.



- 3 Confirm the flash shooting distance range and check to be sure that the ready-light and the (●) in-focus indicator are lit up to shoot.

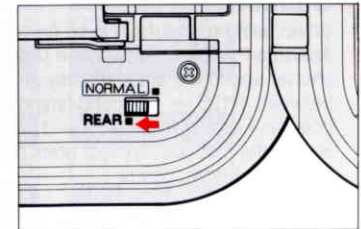
- If both viewfinder ready-light and speedlight (SB-102 or SB-103) ready-light blink for about three seconds after shooting, the flash has operated at maximum power.
- In this case, either reduce the object distance, or select a smaller f-number.



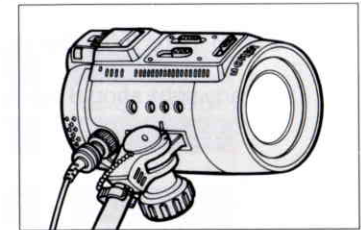
Rear-curtain sync photography is effective when light conditions are poor and one wishes to highlight the movement of subjects at a slow shutter speed. The movement of the subject is represented by a natural stream of light following behind it.



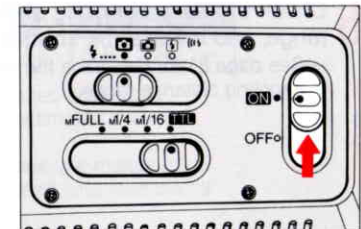
- 1 Set the sync mode switch to "Rear."
—Before entering the water, open the camera back, set the camera's sync mode switch in the direction of the arrow, and close the camera back.



- 2 Set the Speedlight.

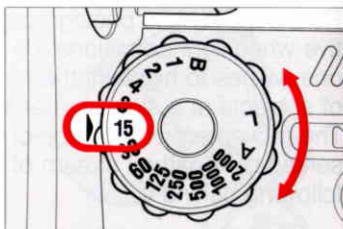


- 3 Turn ON the speedlight's power switch and check to be sure the ready-light is ON.



4 Set the f/stop and shutter speed on the camera.

- The Shutter Speed Dial can be set to either “A,” 1/125 — 1 second, or “B,” but a shutter speed of 1/60 second or slower is most effective for rear-curtain sync photography.
- Set the Focus mode to any desired position.

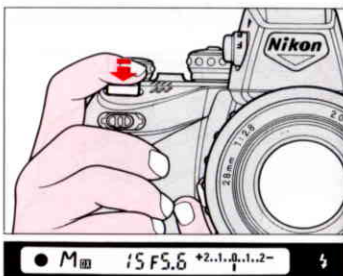


● Caution

When using rear-curtain sync flash in Aperture-Priority Auto Exposure (A) mode, the shutter speed will automatically set itself to between 1/125 — 1 second (standard operation is between 1/125 — 1/30 second). Be careful that your subject does not become blurred at these speeds.

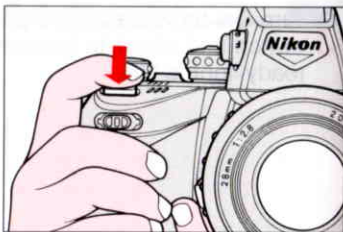
5 Press the shutter release button slightly and check the viewfinder indicator:

- * The (●) in-focus indicator should be lit.
- * The ready-light should be lit.



6 Check the flash shooting distance range, and release the shutter.

- See page 81 for details on the flash shooting distance range.



Reading the Exposure Calculation Chart (SB-104 only)

Objects underwater appear closer than they actually are.

For instance, if the estimated camera-to-subject distance underwater is 1 meter (3.3 feet), the actual distance is 1.33 meters (4.3 feet). The distance scales on the exposure calculation chart and lenses are marked by estimated distances underwater. When you estimate the distance, read the flash shooting distance range from the chart directly.

In TTL flash mode

Read the flash shooting distance range in the “M Full” column on the left of the scale.

For example, when shooting a subject underwater at estimated 0.5 meter (1.6 feet) using ISO 100 film, set the aperture to f/22 or larger (smaller f-number) to get the correct exposure.

ISO100			
m	M FULL	M 1/4	M 1/16
0.3	22 1/2	11 1/2	5.6 1/2
0.5	22	11	5.6
0.7	16	8	4
1	16	8	4
1.5	11	5.6	2.8
2	8	4	—
3	5.6	2.8	—

In manual flash mode

The scales from the left indicate “M Full,” “M 1/4,” and “M 1/16.”

For example, when shooting a subject underwater at an estimated 0.5 meter (1.6 feet) using ISO 100 film, the appropriate f/stop at “M Full” is f/22, at “M1/4” is f/11, and at “M1/16” is f/5.6.

ISO100			
m	M FULL	M 1/4	M 1/16
0.3	22 1/2	11 1/2	5.6 1/2
0.5	22	11	5.6
0.7	16	8	4
1	16	8	4
1.5	11	5.6	2.8
2	8	4	—
3	5.6	2.8	—

■ Important

If the camera-to-subject distance is actually measured underwater, multiply the measured distance by 3/4 to get the estimated distance underwater.

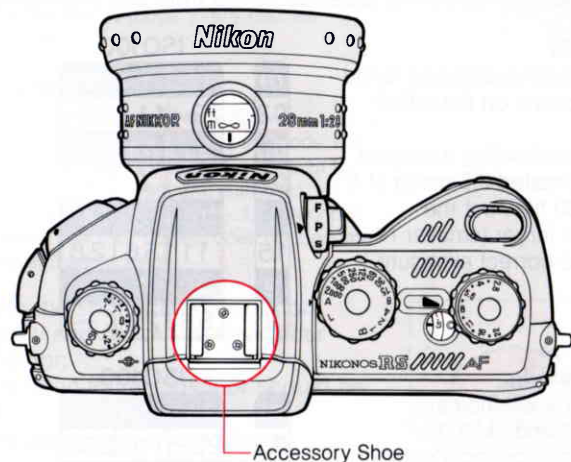
For example, if the actual camera-to-subject distance is 4 meters (13.1 feet), set the lens distance scale to 3 meters (9.8 feet), and read the “3 meters” column on the exposure calculation chart.

◆ Note

For further details on the speedlights (SB-102 and SB-103), see the Instruction Manual provided with each speedlight.

Accessory Shoe

A sensor unit (SU-101) or other accessories can be mounted directly on the Nikonos RS's Accessory Shoe. When attaching an accessory to this shoe, be sure to insert it all the way into the shoe until it stops. Also be sure to insert the ring sufficiently when attaching accessories equipped with lock rings.



● Caution

The Nikonos RS accessory shoe is not a "hot" shoe; no electric current passes between the shoe and the accessory attached to it.

Other Information



Tips on Underwater Photography

Color changes under water

Light absorption is a constant occurrence under water. Water especially tends to absorb colors with a high red content. Water absorbs light from all directions, not only from above but also horizontally and diagonally. It is thus necessary to use a speedlight in order to more faithfully reproduce the color of underwater subjects.

Color Absorption Underwater

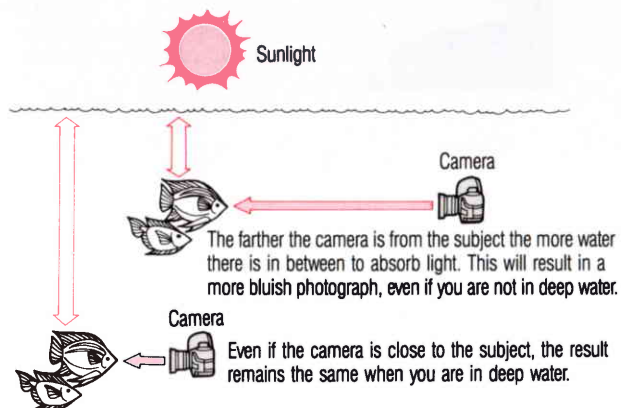
Depth	Color	Violet	Blue	Green	Yellow	Orange	Red
Water surface							
1m (3.3 ft)							
5m (16 ft)							
10m (33 ft)							
15m (49 ft)							
20m (65.6 ft)							
30m (98 ft)							
50m (164 ft)							

The deeper the camera is from the surface of the water, the more water absorbs light and reduces the amount of light.

= color is absorbed

Underwater light and color variations by distance

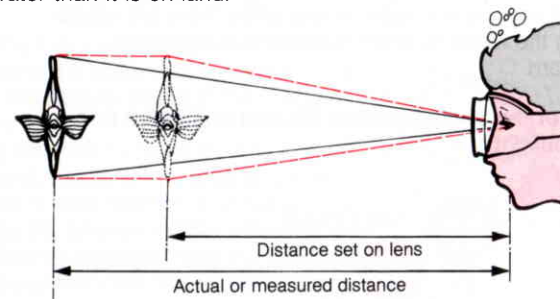
The farther the camera is from the subject, the more the water absorbs light, resulting in a bluish photographs.



Objects appear larger under water

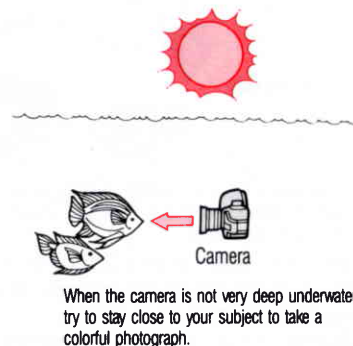
Light under water refracts about 30% more than it does in the air, and when you wear an underwater mask as well, objects appear about 25% closer than they actually are. Objects under water thus appear about 1.33 times larger than their actual size.

Since the camera lens views an object in the same way the human eye does, the angle at which it takes a photograph is shallower under water than it is on land.



Shooting photographs with vivid contrast

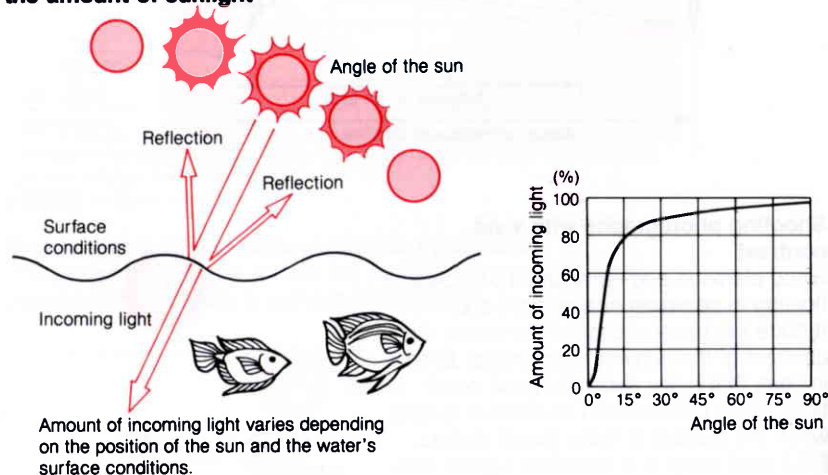
Since plankton and other small particles floating in seawater scatter light and reduce the transparency of the water, the contrast of the subject deteriorates. Even in seas that enjoy generally good conditions, clear pictures can be difficult to take when the subject is more than 5 meters (16.4 feet) away. It is therefore a good idea to get as close as possible to the subject in order to obtain the clearest photograph.



Utilizing sunlight

The amount of sunlight entering the water varies considerably depending on the position of the sun, as some of the rays are reflected off the surface of the water. As shown in the diagram, when the sun is higher than a 45° angle in the sky, more than 90% of the sunlight penetrates into the water. Between 10 a.m. and 2 p.m. on a clear day is thus the best time to do underwater photography, especially in the auto exposure mode. However, the amount of sunlight entering the water is less when there are waves and undulations in the water, or when movement of the water produces white foam.

The relationship of the angle between the sun and water and the amount of sunlight



Light under water enters via the water surface. Shooting at a slightly upward angle allows the sunlight to enter the background and creates a pleasant contrast.

However, if it is aimed up toward the surface, you will be taking photographs against the light. Aiming the camera parallel to the surface (horizontally) will be partially against the light, producing a photograph of good contrast, though parts of the subject may be in shadow and come out dark. This problem can be alleviated to some degree by using exposure compensation or a speedlight. (See pages 65 ~ 66, 74 ~ 78.)

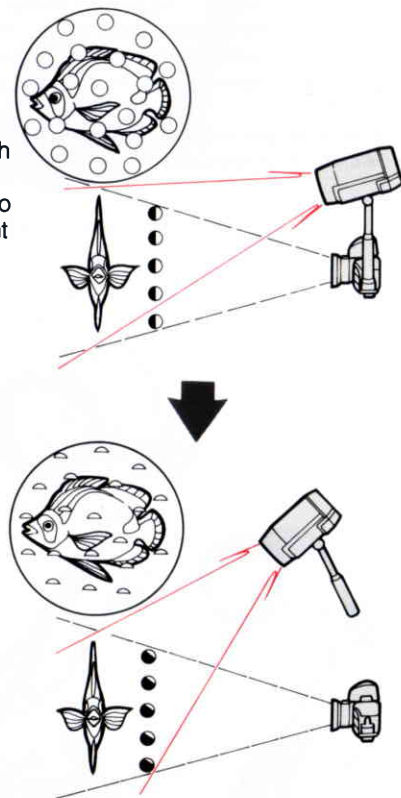
Using the speedlight

The deeper one goes underwater and the farther the shooting distance, the more the red content of colors is absorbed, rendering them increasingly bluer. Nikon therefore recommends using a speedlight when taking photographs under water.

A speedlight is also effective when you want to take photographs inside caves, of divers faces behind their masks, or in any other situation where parts of the subject are in shadow.

When there is a large volume of floating particles in the water and transparency is poor, if the flash is aimed at the subject from the front, the light of the speedlight reflects onto the particles floating in front of the lens, resulting in a photograph which looks like it were taken in a snowstorm. To minimize the amount of light reflecting onto these floating particles, hold the speedlight as far away from the camera as possible and aim the speedlight at the subject diagonally.

If sand or other matter has temporarily been stirred up from the ocean floor, wait for some time for the cloudiness to settle down again before taking the photograph.



Holding the camera correctly

In most cases, a poorly focused photograph is the result of unsteady handling of the camera. Special care needs to be taken in holding the camera steady when taking photographs under water in order to produce a sharp picture.

When taking pictures underwater, take special care not to damage marine life on rocks, such as coral. Try not to touch coral or other marine life by keeping yourself afloat in the water.

Since underwater photography always presents a problem of stability, set the camera in autofocus mode and choose a higher shutter speed to prevent the subject from becoming blurred. Also try to stop your body movement at the moment when releasing the shutter.

Illustrations and editorial supervision supplied by Akira Tateishi, Marine Art Center, Co., Ltd.

Optional Accessories

Speedlights

■ SB-104

The speedlight SB-104 is an underwater speedlight designed especially for use with the Nikonos RS. This electronic flash unit features a high-power output with guide number 32 (105 in feet) (ISO 100, on land).

- The SB-104 features automatic through-the-lens (TTL) flash exposure control which offers a matrix balanced fill-flash operation, providing correct exposure for both the main subject and the background, plus manual flash exposure control.
- The SB-104 also features a flash signal function to indicate your floating position and a Flash Slave function whereby the SB-104 fires simultaneously with another speedlight over a cordless link.
- Alert lights will blink to alert you when the flash unit is firing at full output, when there are water leaks, or when the unit is overheating or malfunctioning.
- The SB-104 in combination with the Nikonos RS is designed to withstand water pressure up to a depth of 100 meters (328 feet).



■ SB-102 and SB-103

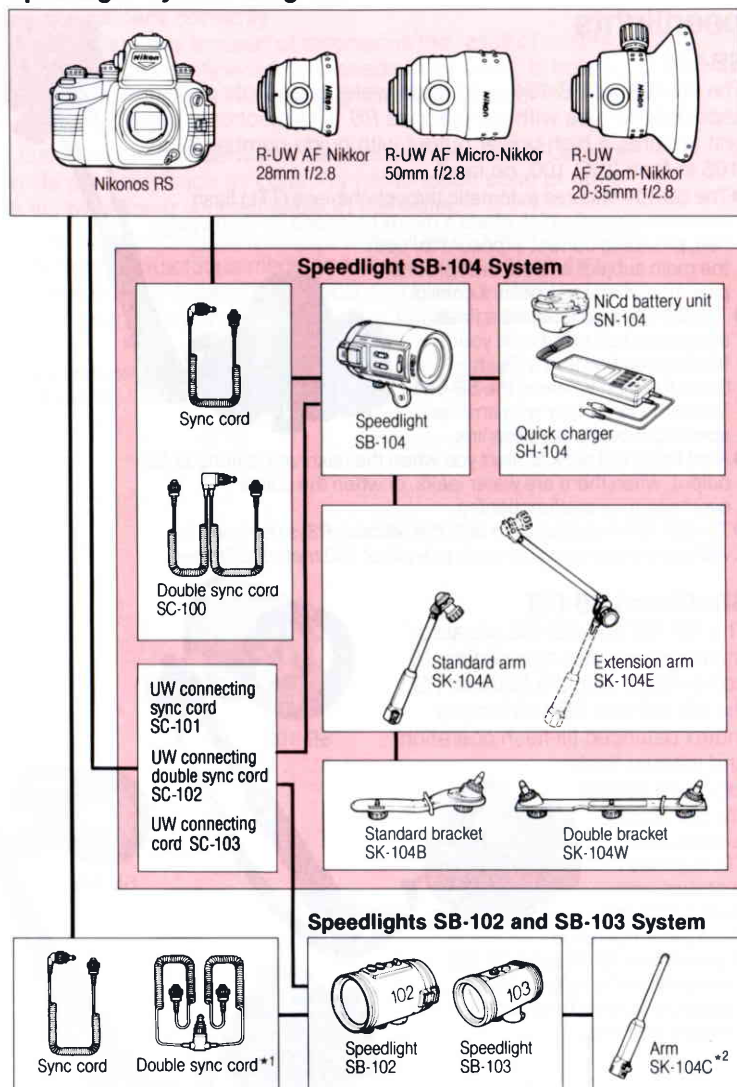
The SB-102 and SB-103 are automatic, underwater speedlights. In combination with the Nikonos RS, the SB-102 and SB-103 feature matrix balanced fill-flash operation and manual flash exposure control.

The SB-102 also features non-TTL auto flash exposure (with the SU-101) and Flash Slave operation.

- Speedlights SB-102 and SB-103 are designed to withstand water pressure up to a depth of 50 meters (164 feet).



Speedlight System Diagram



*1 Not usable with R-UW AF Zoom-Nikkor 20-35mm f/2.8 lens.

*2 Use the bracket SK-104B or SK-104W designed for the SB-104 system.

R-UW AF Nikkor Lenses

The R-UW AF Nikkor lenses are underwater autofocus lenses specially designed for use with the Nikonos RS.

**R-UW AF Nikkor
28mm f/2.8
(standard lens)**



**R-UW AF Micro-Nikkor
50mm f/2.8
(micro lens)**



**R-UW AF Zoom-Nikkor
20-35mm f/2.8
(zoom lens)**

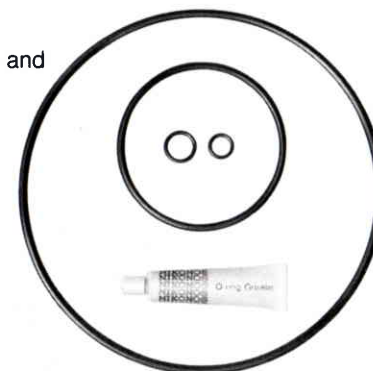


● Caution

Never put the lens into the water by itself even with the rear lens cap attached, as the rear lens cap is not waterproof.

O-ring set

A set of spare O-rings and O-ring lubricant.



Remote Cord, Camera Case, etc.

Remote cord (MC-100)

(for Nikonos RS only)

Connect the remote cord to remote connector on the Nikonos RS to release the shutter from a distance.

System case CT-N1

Accepts the Nikonos RS, three R-UW AF Nikkor lenses and the SB-104 standard set.

Eyepiece Cover DK-100

Use this eyepiece cover to cover the viewfinder eyepiece to prevent external light from entering the camera through the viewfinder in aperture-priority auto exposure mode.

UW connecting sync cord SC-101

UW connecting double sync cord SC-102

UW connecting cord SC-103

Use these cords to exchange cameras and speedlights underwater without having to surface.

Notes on Batteries

Generally speaking, battery power weakens as the temperature drops, power recovers when batteries are not used for a relatively short time, and power drains off slowly when not used for a long time. Be sure to check the battery power before use, and replace the battery with a fresh one before it becomes exhausted.

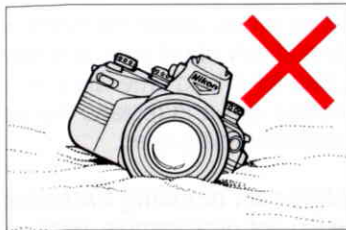
Notes on handling batteries

- Do not disassemble, heat, short-circuit, or throw batteries into a fire, as explosions may result.
- If the camera will not be used for a long time, remove the battery from the camera and store it in a cool place (20°C).
 - Keep batteries out of the reach of children. If swallowed, call a doctor immediately.

Taking Care of Your Camera

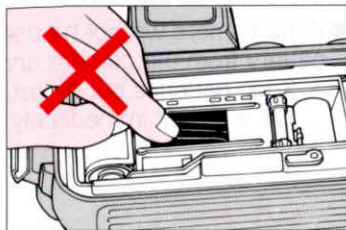
Problems with sand, dirt, and other foreign matter

Take care to ensure that dirt, mud, sand, dust, water, salt, or other foreign matter do not enter the camera as they can cause damage. The warranty on your camera does not always cover damage of this type.



Do not touch the shutter curtain

The shutter curtain is made of extremely thin material. To preserve its shape and protect it from damage, take extra care not to push against it, pierce it, or even let it be subject to winds, such as that from a blower.



Taking care of your camera body

Use a blower to remove dust from the camera body and wipe it with soft tissue or cloth lightly. After use, remove any salt attached on the body with a soft tissue or cloth moistened with fresh water, then wipe it with dry cloth lightly. Do not use thinner, benzene, or other active agents.



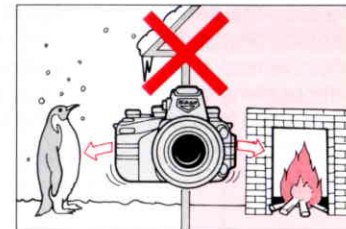
Cleaning your camera lens and mirror

Use only lens tissue to remove dust from the lens, viewfinder eyepiece, or mirror inside the camera. Never use cleaning agents on these parts.

Do not put the camera in sandy places.

Avoid extreme changes in temperature

Extreme changes in temperature may cause small droplets of moisture to condense both inside and outside the camera. When carrying the camera from the cold outdoors to a warm indoors (or vice versa), or when putting the camera into a bag whose temperature inside is vastly different from the outside, be sure to allow the camera to adjust itself gradually to temperature changes so that moisture condensation is avoided.



Safekeeping your camera

When the camera is not to be used for a long period of time, first remove the battery before storing it. Leaving the battery in the camera will subject it to damage should the batteries start to leak, as they often do over long periods. It is a good idea to place the camera inside a case that will protect it from moisture and to include a moisture-absorbing agent in the case. Remove O-ring from camera body when storing camera to prevent flat spots from occurring due to constant pressure on the O-ring. Always use a body cap on the camera's lens opening when storing.



Storing location

Store the camera in a cool, dry place to prevent mold from growing on it. Do not leave the camera inside an enclosed location, such as a car, that is subject to sunlight and high temperatures. Also avoid humid areas or places subject to chemicals such as camphor or naphthalene (moth balls).

Release the shutter from time to time.

Replace desiccating agents from time to time to keep their effectiveness. If the camera is stored over a long period of time without being operated, mold may accumulate and cause damage. It is a good idea to take the camera out of storage from time to time and simply release the shutter.

Shutter Troubleshooting

Check the following items if the shutter cannot be released.

Warning Indicator	Cause	Action to be taken	Reference
—	Shutter speed dial is set to "L."	Set the shutter speed dial to another position.	Page 51
[ISO/DX], "Err" in viewfinder blink.	Film speed is set to "DX" while a non-DX film is loaded.	Set the film speed manually.	Page 31
"Err" in viewfinder and frame counter LED (red) blink.	Film (of DX type) is advanced while not correctly loaded.	Open the camera back and reset the film.	Pages 33 ~ 36
"End" in viewfinder and frame counter LED (red) blink.	Film has been used up.	Rewind the film.	Pages 46 ~ 47
Frame counter LED (green) blinks.	Film cartridge of rewound film is still in the camera.	Remove the film cartridge.	Page 47
(●) in-focus indicator in viewfinder goes out.	Subject is not in focus.	Retry focusing, or focus in Power Manual Focus mode.	Page 57
(●) in-focus indicator in viewfinder blinks.	Autofocus is not possible.	Retry focusing in Power Manual Focus mode.	Page 57
All indicators in viewfinder blink or go out.	Battery has weakened.	Replace the battery.	Pages 22 ~ 24

If the shutter still cannot be released properly after following the procedures above, take the camera to your nearest Nikon service center.

In certain cases, due to static electricity or poorly loaded battery, the Nikonos RS's microcomputer may turn the camera off, even with fresh, properly installed battery. For the same reason, film may not advance properly. In each of these cases, to resume operation, simply turn the power OFF and turn ON again, or remove battery and install again.

Specifications

Type of camera

Picture format

Lens mount

Lenses

Viewfinder

Eyepoint

Focusing screen

Field of view

Magnification

Diopter

Viewfinder indications

(Continuous display with illuminator while pressing shutter button slightly)

Reflex mirror

Autofocus detection system

Autofocus detection range

Autofocus modes

Autofocus lock

Exposure metering systems

Metering range

Exposure modes

Exposure compensation

Aperture control

Film speed setting

Integral-motor autofocus, 35mm single-lens reflex underwater camera

24mm x 36mm (standard 35mm film format)

Nikonos R-UW mount

AF Nikkor lenses for Nikonos RS underwater camera:

R-UW AF Nikkor 28mm f/2.8 (standard)

R-UW AF Micro-Nikkor 50mm f/2.8

R-UW AF Zoom-Nikkor 20-35mm f/2.8

High-eyepoint action finder

Approx 60mm (2.4 inches)

Nikon advanced B-type BrightView Screen

Approx 92% (at infinity)

Approx 0.39x (underwater with 28mm f/2.8 lens at infinity setting)

— 0.75 dpt

Focus indicators, exposure mode, shutter speed, aperture value, film speed, film speed setting mode (DX/ISO), unacceptable film loading alert (ISO mark blinks), electronic analog display indicator, exposure compensation, overexposure or underexposure (Hi/Lo) alert, ready-light LED

Automatic instant-return type

TTL phase detection system using Nikon's advanced AM 200 autofocus sensor module (activated by pressing shutter button slightly).

— Focus tracking can be automatically activated once camera detects a moving subject.

EV -1 to EV +19 (at ISO 100)

Single Servo Autofocus (S) mode, Continuous Servo Autofocus (C) mode, Power Manual Focus (P) mode, Freeze Focus (F) mode

Possible in Single Servo Autofocus mode using shutter button

Matrix metering system (5 segments) in Aperture-Priority Auto Exposure mode

Center-Weighted metering in Manual Exposure mode.

EV +3 to EV +20 (at ISO 100)

Aperture-Priority Auto Exposure (A) mode, Manual Exposure mode

Possible using exposure compensation dial within EV ± 2 range in 1/3 EV step (exposure compensation indicator blinks)

Aperture coupling lever control from body (from f/2.8 to f/22)

Automatic for DX-coded films; manual setting possible (manual setting priority)

Film speed range

Film loading

Film advance

Frame counter

Film rewind

Number of film rolls per fresh 6V lithium battery

Shutter

Shutter speed

Warning indications

ISO 25 to 5000 for DX-coded film; ISO 6 to 6400 for manual setting

Film automatically advances to first frame when shutter button is pressed once after loading.

If no film is loaded, frame counter LED (green) blinks when shutter release button is pressed slightly.

If non-DX film is loaded while film speed is set to "DX," shutter button is locked and ISO/DX and "Err" indicators blink.

Film automatically advances one frame when shutter is released.

Additive type, automatically reset when camera back is opened

Automatic rewind by sliding film rewind lever; approx 25 sec. per 36-exposure film, stops automatically when film is completely rewound and the frame counter LED (red) blinks.

36-exposure film: approx 70 rolls

(For autofocus operation with R-UW Nikkor 28mm f/2.8 lens covering the full range from infinity (∞) to the closest distance and back to infinity (∞) before each shot, at shutter speed of 1/125 sec. or faster, using a fresh 6V lithium battery pack (DL223A or CR-P2 type)) Electromagnetically controlled vertical-travel focal-plane shutter

From 1/2000 to 1 sec., "B" setting

- "Err" indicator in viewfinder and frame counter LED (red) blink: Film is not loaded correctly, film does not advance correctly.

- DX/ISO display and "Err" indicator blink: Non-DX film is loaded while film speed is set to "DX"

- "End" indicator in viewfinder and frame counter LED (red) blink: End of roll.

- Frame counter LED (red) blinks: Film is rewound completely.

- "Hi" or "Lo" indicator in viewfinder blinks:

- Overexposure or underexposure in auto exposure (A) mode

- All viewfinder indicators blink: Weak battery, needs replacement

- Ready-light in viewfinder blinks: Flash is fired at full output.

Flash synchronization

- Shutter speed is automatically set to 1/125 sec. if it is set to 1/250 sec. or faster.
- TTL flash is possible when speedlight is mounted.
- Film speed range: ISO 25 to 1000 (for TTL flash)
- Flash mode: Matrix balanced fill-flash is possible using matrix metering (1/30 to 1/125 sec. when sync mode is set to "Normal.").
- Shutter speed is controlled between 1 sec. and 1/125 sec. when it is set to rear-curtain sync.
- TTL flash is possible using center-weighted metering.
- Flash sync control: Interchangeable front- and rear-curtain sync (at body).

Flash ready-light

Viewfinder "Ready-light" LED illuminates when a Nikon Speedlight (SB-104, 103 or 102) is fully recharged and ready to fire; blinks to alert that flash is fired at full output.

Accessory shoe Sync socket Remote control socket Camera back

For mounting Nikon SU-101 sensor unit
Nikonos V sync socket
4-core socket

Hinged double camera back with inner back (detachable) containing film cartridge confirmation window

Power source Power switch

6V lithium battery pack (DL223A or CR-P2 type)
Power is turned on by setting shutter speed dial to a position other than "L" and pressing shutter button slightly. (Power is turned off approx 16 sec. after finger is removed from shutter button.)

Checking battery power

Battery power is sufficient if shutter speed and aperture indicators remain on for approx. 16 sec. after finger is removed from shutter button while the shutter speed dial is set to a position other than "L."

Battery power is insufficient if these indicators turn off immediately after finger is removed from shutter button.

Battery has weakened if all indicators blink; it is dead if they do not illuminate at all.

Tripod socket Durability against underwater pressure Dimensions (W × D × H)

1/4 inch
100 meters (328 feet)

196 × 151 × 85mm, (7.7 × 5.9 × 3.3 in.)

Weight On land

Approx. 2,130g (4.7 lbs.) (Nikonos RS only)
Approx. 2,680g (5.9 lbs.) (with R-UW AF Nikkor 28mm f/2.8 lens)

Underwater

Approx. 970g (2.1 lbs.) (with R-UW AF Nikkor 28mm f/2.8 lens)

All specifications apply when using a fresh lithium battery pack (DL223A) at ordinary temperature (20°C). Specifications and design are subject to change without notice.

"This digital apparatus does not exceed the (Class B) limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications."

This product is a strategic product subject to COCOM regulations. It should not be exported without authorization from the appropriate governmental authorities.

NIKON CORPORATION